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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

DILLON, SAMUEL A

ART UNIT

PAPER NUMBER

2185

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/763,099	<b>Applicant(s)</b> FRANK ET AL.	
	<b>Examiner</b> SAMUEL DILLON	<b>Art Unit</b> 2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 17-28,30-41,43 and 44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 17-28,30-41,43 and 44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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### **DETAILED ACTION**

1. In view of the pre-brief appeal conference decision mailed on November 12, 2009, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below. A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing at the end of this action. To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

### **I. ACKNOWLEDGEMENT OF INFORMATION DISCLOSURE STATEMENT**

2. The information disclosure statements (IDS) submitted on June 3, 2009 are in compliance with the provisions of 37 CFR 1.97. As required by M.P.E.P. ' 609 (C), the applicant's submission of the submitted IDS's are acknowledged by the examiner and the cited references have been considered in the examination of the claims now pending. As required by M.P.E.P. ' 609 C(2), a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

**II. RESPONSE TO AMENDMENT(S) / ARGUMENT(S)**

3. **Applicant's arguments (pgs 1-3 of the Pre-Brief Conference request) with respect to the 35 U.S.C. 102(e) rejections of Claims 17-27, 40, 41 and 43 have been fully considered and are persuasive.** However, they are moot in view of the new ground(s) of rejection, as described below.

4. **Applicant's arguments (pgs 4-5 of the Pre-Brief Conference request) with respect to the 35 U.S.C. 103(a) rejections of Claims 28, 30-39 and 44 have been fully considered but they are not persuasive.** The rejections have been upheld, and the Applicant directed below for traversal.

5. **The Applicant contends (pg 4 of the Pre-Brief Conference request) that it is improper to combine the teachings of Wang with Fye.** The Examiner respectfully disagrees. In the previous action, the Examiner stated that both were analogous art in that they deal with multicasting / broadcasting writes to multiple memory devices. Multicasting and broadcasting are both well known methodologies for sending writes to one or more recipients. Both references related to memory writes to multiple memory devices, and the Examiner asserts that it is not improper to combine their teachings.

6. **The Applicant contends (pgs 4-5 of the Pre-Brief Conference request) that Wang in view of Fye fails to disclose providing a root partition with the RAG characteristics on the storage medium.** The Examiner respectfully disagrees. Fye discloses a header that describes which addresses are associated with a given agent (*figure 2*). This info is stored by the agent. The claim reads "*a root partition having a plurality of characteristics associated with a redundant array (RA) group that includes a plurality of RA partitions*". Fye discloses "*a root partition having a plurality of characteristics*", in that the header of an agent discloses a plurality of characteristics. Wang discloses a plurality of target agents that are redundant array partitions.

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The Examiner found it obvious to modify Wang to broadcast writes using Fye's method, so Fye's agents would be managing redundant array partitions. Accordingly, Wang in view of Fye does disclose providing a root partition with the RAG characteristics on the storage medium.

7. Regarding all other Claims not specifically traversed above and whose rejections were upheld, the Applicant contends that the listed claims are allowable by virtue of their dependence on other allowable claims. As this dependence is the sole rationale put forth for the allowability of said dependent claims, the Applicant is directed to the Examiner's remarks above.

Additionally, any other arguments the Applicant made that were not specifically addressed in this Office Action appeared to directly rely on an argument presented elsewhere in the Applicant's response that was traversed, rendered moot or found persuasive above.

### III. REJECTIONS BASED ON PRIOR ART

#### **Claim Rejections - 35 USC ' 103 – Wang and Fye**

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 17-28, 30-41, 43 and 44** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (*US Patent 6,834,326*) in view of Fye (*US Patent 5,983,024*).

10. As per **Claim 28**, Wang disclose(s) a method comprising: providing, on a storage medium, a root partition (*physical storage of a RAID volume on a disk, figure 5, column 8 lines 42-54*) associated with a redundant array (RA) group that includes a plurality of RA partitions, providing, on the storage medium, a RA partition of the plurality of RA partitions (*RAID volumes, figure 5, column 8 lines 42-54*), and receiving, via the network interface, a data access command multicast to the plurality of RA partitions (*figure 8e, column 8 lines 42-54*).

For the purposes of this rejection, Wang is not relied upon for disclosing the root partition having a plurality of characteristics, and determining that the data access command pertains to the RA partition based at least in part on the plurality of characteristics. Wang discloses multicasting write commands only to the memory devices that are associated with the write command (*figure 8e*).

Fye discloses multicasting write commands to all memory devices (*broadcasting*), and that the memory devices then listen (*snoop*) for commands that they are interested in (*column 2 lines 8-16*). More specifically, Fye discloses a root partition having a plurality of characteristics (*figure 2*), and determining that a data access command pertains to a partition based at least in

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part on the plurality of characteristics (*"When a broadcast transaction of interest is detected", column 2 lines 8-16*).

Wang and Fye are analogous art in that they deal with multicasting / broadcasting writes to multiple memory devices. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to modify Wang to broadcast a write to all the memory devices, and then have each individual memory device determine if the write was relevant, as opposed to having the switch keep track of that information, per the teachings of Fye.

The motivation for doing so would have been that broadcasting and multicasting are two standard methodologies in networking, and the Examiner asserts that choosing one or the other would have been obvious because they are interchangeable methodologies with different benefits and strengths, are predictable and well known in the art. More specifically, broadcasting writes moves functionality from the switch to the memory devices, and therefore a possible motivation would be to require less functionality on the switch. Therefore, it would have been obvious to modify Wang as per the teachings of Fye for the benefit of moving functionality from the switch to the storage devices, to obtain the invention of Claim 28.

11. As per **Claim 17**, Wang and Fye disclose(s) a storage appliance comprising: a network interface (*Wang, RAID controller/switch, more specifically the switch functionality, figure 5*); a storage medium; and a controller coupled to the network interface and the storage medium (*Wang, RAID controller/switch, more specifically the RAID controller functionality, figure 5*) and configured to provide a root partition (*Wang, filesystem or virtual disk, column 8 lines 56-63*) on the storage medium, the root partition on the storage medium, the root partition defining a plurality of characteristics (*Wang, column 9 lines 13-42*) of a redundant array (RA) group that includes a plurality of RA partitions (*Wang, RAID volumes, figure 5, column 8 lines 42-54*), to provide a RA partition on the storage medium, the RA partition being one of the plurality of RA

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partitions (*Wang, services a read request, column 8 lines 42-54*), to receive, via the network interface, a data access command multicast to the plurality of RA partitions (*column 8 lines 42-54*), and to determine that the data access command pertains to the RA partition based at least in part on the plurality of characteristics (*Fye, column 2 lines 8-16, figure 2*).

12. As per **Claim 18**, Wang and Fye disclose(s) the storage appliance of Claim 17, wherein the controller is further configured to receive, via the network interface, a plurality of partition commands (*Wang, read requests of the nested controller, figure 6, column 8 lines 56-64*) from a host (*the parent controller, figure 6*); and to provide the root partition and the RA partition based at least in part on the plurality of partition commands (*Fye, column 2 lines 8-16, figure 2*).

13. As per **Claim 19**, Wang and Fye disclose(s) the storage appliance of Claim 17, wherein the plurality of characteristics includes a multicast set associated with the RA group (*Wang, column 9 lines 32-42*).

14. As per **Claim 20**, Wang and Fye disclose(s) the storage appliance of Claim 19, wherein the controller is configured to receive a multicast set command (*Wang, write command to the nested controller, figure 6*) from a host (*Wang, parent controller, figure 6*) via the network interface, and to establish the multicast set associated with the RA group based at least in part on the multicast set command (*Fye, column 2 lines 8-16, figure 2*).

15. As per **Claim 21**, Wang and Fye disclose(s) the storage appliance of Claim 17, wherein the data access command is multicast to the plurality of RA partitions using an Internet Protocol address (*Wang, column 8 lines 31-41*).

16. As per **Claim 22**, Wang and Fye disclose(s) the storage appliance of Claim 17, wherein the controller is further configured to receive, via the network interface, another data access command multicast to the plurality of RA partitions (*Wang, write received and then multicast, column 12 lines 56-67*); to receive, via the network interface, a response to the another data



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access command (*Wang, multiack's are sent back in response, column 12 lines 56-67*); and to disregard the another data access command based at least in part on the response (*Wang, column 12 lines 65-67*).

17. As per **Claim 23**, Wang and Eye disclose(s) the storage appliance of Claim 17, wherein the plurality of characteristics includes a type of the RA group and a description of the plurality of RA partitions and the controller is further configured to determine that the data access command pertains to the RA partition based at least in part on the type of the RA group and the description of the plurality of RA partitions (*Wang, column 9 lines 32-42*).

18. As per **Claim 24**, Wang and Eye disclose(s) the storage appliance of Claim 23, wherein the type is a stripe and the plurality of characteristics further includes a length of the stripe (*Wang, column 9 lines 32-35*).

19. As per **Claim 25**, Wang and Eye disclose(s) the storage appliance of Claim 17, wherein the plurality of characteristics includes a parity rule (*Wang, RAID level includes parity, col. 9 lines 32-42*).

20. As per **Claim 26**, Wang and Eye disclose(s) the storage appliance of Claim 17, wherein the plurality of RA partitions are associated with a plurality of logical block addresses (LBAs) and the controller is further configured to calculate, based at least in part on the plurality of characteristics of the RA group defined in the root partition, which LBAs of the plurality of LBAs are associated with the RA partition (*Wang, column 17, lines 47-54*).

21. As per **Claim 27**, Wang and Eye disclose(s) the storage appliance of Claim 17, wherein the controller is configured to receive the data access command from a host and the controller is further configured to transmit, via the network interface, data directly to another RA partition of the plurality of RA partitions based at least in part on the data access command (*Wang, standard NetSCSI, column 11 lines 63-67*).

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22. As per **Claim 30**, Wang and Fye disclose(s) the method of Claim 28, wherein the plurality of characteristics includes a multicast set associated with the RA group (*Wang, Fye, figure 2*).

23. As per **Claim 31**, Wang and Fye disclose(s) the method of Claim 28, wherein the data access command is multicast to the plurality of RA partitions using an Internet Protocol address (*Wang, column 8 lines 31-41*).

24. As per **Claim 32**, Wang and Fye disclose(s) the method of Claim 28, further comprising: receiving, via the network interface, another data access command multicast to the plurality of RA partitions (*Wang, write received and then multicast, column 12 lines 56-67*); receiving, via the network interface, a response to the another data access command (*Wang, multiack's are sent back in response, column 12 lines 56-67*); and disregarding the another data access command based at least in part on the received response (*Wang, column 12 lines 65-67*).

25. As per **Claim 33**, Wang and Fye disclose(s) the method of Claim 28, wherein the plurality of characteristics includes a type of the RA group and a description of the plurality of RA partitions (*Fye, figure 2*) and said determining that the data access command pertains to the RA partition is based at least in part on the type of the RA group and the description of the plurality of RA partitions (*Fye, column 2 lines 8-16, column 3 line 53 to column 4 line 14*).

26. As per **Claim 34**, Wang and Fye disclose(s) the method of Claim 33, wherein the type is a stripe and the plurality of characteristics further includes a length of the stripe (*Wang, column 9 lines 32-35, Fye, figure 2*).

27. As per **Claim 35**, Wang and Fye disclose(s) the method of Claim 28, wherein the plurality of characteristics includes a parity rule (*Wang, RAID level includes parity, col. 9 lines 32-42*).

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28. As per **Claim 36**, Wang and Fye disclose(s) a machine-accessible storage medium having instructions, which, then executed, results in the machine: providing a root partition (*Fye, figure 2*) on a storage medium, the root partition defining a plurality of characteristics of a redundant array (RA) group that includes a plurality of RA partitions (*RAID volumes, figure 5, column 8 lines 42-54*), providing a RA partition on the storage medium, the RA partition being one of the plurality of RA partitions, receiving, via a network interface, a data access command multicast to the plurality of RA partitions (*Wang, column 8 lines 42-54, Fye, column 2 lines 8-16*), and determining that the data access command pertains to the RA partition based at least in part on the plurality of characteristics (*Fye, column 2 lines 8-16, figure 2*).

29. As per **Claim 37**, Wang and Fye disclose(s) the machine-accessible storage medium of Claim 36, wherein the instructions, when executed, further results in the machine: receiving, via the network interface, one or more commands from a host; and providing the root partition and the RA partition based at least in part on the received one or more commands (*Wang, servicing the read request to the parent controller, column 8 lines 56-64*).

30. As per **Claim 38**, Wang and Fye disclose(s) the machine-accessible storage medium of Claim 36, wherein the plurality of characteristics includes a multicast set associated with the RA group (*Wang, column 9 lines 32-42*).

31. As per **Claim 39**, Wang and Fye disclose(s) the machine-accessible storage medium of Claim 36, wherein the data access command is multicast to the plurality of RA partitions using an Internet Protocol address (*Wang, column 8 lines 31-41*).

32. As per **Claim 40**, Wang and Fye disclose(s) an apparatus comprising: a network interface (*Wang, RAID controller/switch, more specifically the switch functionality, figure 5*); and a controller (*Wang, RAID controller/switch, more specifically the RAID controller functionality, figure 5*) configured to transmit, via the network interface, a first partition command to establish

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a root partition on a storage medium (*Wang, column 9 lines 13-22, lines 32-42*); to transmit, via the network interface, a plurality of characteristics of a redundant array (RA) group, which includes a plurality of RA partitions, to be stored in the root partition (*Wang, column 9 lines 13-22, lines 32-42*); to transmit, via the network interface, a second partition command to establish a RA partition of the plurality of RA partitions, on the storage medium (*Wang, column 9 lines 13-22, lines 32-42*); and to multicast, via the network interface, a packet to the plurality of RA partitions, the packet having a data access command and a logical block address (LBA) to which the data access command pertains, the LBA associated with only a subset of the plurality of RA partitions (*Fye, column 2 lines 8-16, figure 2*).

33. As per **Claim 41**, Wang and Fye disclose(s) the apparatus of Claim 40, wherein the controller is further configured to transmit a partition command to each of a plurality of storage appliances associated with a respective plurality of storage media to establish the plurality of RA partitions (*Wang, column 9 lines 13-22, lines 32-42*).

34. As per **Claim 43**, Wang and Fye disclose(s) the apparatus of Claim 42, wherein the controller is configured to multicast the packet by being configured to transmit the packet with a multicast Internet Protocol address (*Wang, col 11 lines 63-67*).

35. As per **Claim 44**, Wang and Fye disclose(s) the method of Claim 28, further comprising: receiving, via the network interface, one or more commands from a host; and providing the root partition and the RA partition based at least in part on the received one or more commands (*Wang, servicing the read request to the parent controller, column 8 lines 56-64*).

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**IV. CLOSING COMMENTS**

**a. STATUS OF CLAIMS IN THE APPLICATION**

36. The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. ' 707.07(i):

**a(1). CLAIMS NO LONGER IN THE APPLICATION**

37. Claims 1-16, 29 and 42 were cancelled by amendment.

**a(2). CLAIMS REJECTED IN THE APPLICATION**

38. Claims 17-28, 30-41, 43 and 44 have received an action on the merits.

**b. DIRECTION OF FUTURE CORRESPONDENCES**

39. Any inquiry concerning this communication or earlier communications should be directed to Sam Dillon whose telephone number is 571- 272-8010. The examiner can normally be reached on 9:30-6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on 571-272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

**IMPORTANT NOTE**

40. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sanjiv Shah/  
Supervisory Patent Examiner, Art Unit 2185

Sam Dillon  
Examiner  
Art Unit 2185